ESTUARINE COASTAL AND SHELF SCIENCE

Volume 22
1986

ACADEMIC PRESS
London Orlando San Diego
New York Austin Boston
Sydney Tokyo

Published by Academic Press Inc. (London) Limited in association with the Estuarine and Brackish-water Sciences Association

ISSN 0272-7714

Copyright © 1986, by Academic Press Inc. (London) Limited

ALL RIGHTS RESERVED

No part of this volume may be reproduced in any form, by photostat, microfilm, or any other means, without prior permission from the publishers.

Printed in Great Britain

Contents of Volume 22

Number 1, January 1986

Stull, J. K., Haydock, C. I. and Montagne, D. E., Effects of *Listriolobus pelodes* (Echiura) on coastal shelf benthic communities and sediments modified by a major California wastewater discharge 1

Anderson, F. E. and Meyer, L. M., The interaction of tidal currents on a disturbed intertidal bottom with a resulting change in particulate matter quantity, texture and food quality 19

Owens, N. J. P., Estuarine nitrification: a naturally occurring fluidized bed reaction? 31

Özsoy, E., Ebb-tidal jets: a model of suspended sediment and mass transport at tidal inlets 45

Quinn, N. J. and Kojis, B. L., Annual variation in the nocturnal nekton assemblage of a tropical estuary 63

Cammen, L. M. and Walker, J. A., The relationship between bacteria and micro-algae in the sediment of a Bay of Fundy mudflat 91

Lipcius, R. N. and Subrahmanyam, C. B., Temporal factors influencing killifish abundance and recruitment in Gulf of Mexico salt marshes 101

Mackas, D. L. and Anderson, E. P., Small-scale zooplankton community variability in a northern British Columbia fjord system 115

Number 2, February 1986

Baillie, P. W., Oxygenation of intertidal estuarine sediments by benthic microalgal photosynthesis 143

West, J. R. and Mangat, J. S., The determination and prediction of longitudinal dispersion coefficients in a narrow, shallow estuary 161

Anderson, G. F., Silica, diatoms and a freshwater productivity maximum in Atlantic Coastal Plain estuaries, Chesapeake Bay 183

New, A. L., Dyer, K. R. and Lewis, R. E., Predictions of the generation and propagation of internal waves and mixing in a partially stratified estuary . . . 199

Feely, R. A., Massoth, G. J., Baker, E. T., Gendron, J. F., Paulson, A. J. and Crecelius, E. A., Seasonal and vertical variations in the elemental composition of suspended and settling particulate matter in Puget Sound, Washington. . . . 215

PEJRUP, M., Parameters affecting fine-grained suspended sediment concentrations in a shallow micro-tidal estuary, Ho Bugt, Denmark 241

YELVERTON, G. F. and HACKNEY, C. T., Flux of dissolved organic carbon and pore water, through the substrate of a *Spartina alterniflora* marsh in North Carolina . 255

NOTICE 269

NUMBER 3, MARCH 1986

VOUDRIAS, E. A. and SMITH, C. L., Hydrocarbon pollution from marinas in estuarine sediments 271

SCHWARTZ, D. L., MULLINS, H. T. and BELKNAP, D. F., Holocene geologic history of a transform margin estuary: Elkhorn Slough, central California 285

ROSENTAL, R., EAGLE, G. A. and ORREN, M. J., Trace metal distribution in different chemical fractions of nearshore marine sediments 303

BARNES, R. S. K., Daily activity rhythms in the intertidal gastropod *Hydrobia ulvae* (Pennant) 325

SALEMAA, H., Breeding biology and microhabitat utilization of the intertidal isopod *Idotea granulosa* Rathke, in the Irish Sea 335

THORMAN, S., Physical factors affecting the abundance and species richness of fishes in the shallow waters of the southern Bothnian Sea (Sweden) 357

NOTES AND DISCUSSIONS

PECKOL, P. and BAXTER, D., Population dynamics of the onuphid polychaete *Diopatra cuprea* (Bosc) along a tidal exposure gradient. 371

HARDWICK-WITMAN, M. N., Aerial survey of a salt marsh: ice rafting to the lower intertidal zone 379

NUMBER 4, APRIL 1986

PAKULSKI, J. D., The release of reducing sugars and dissolved organic carbon from *Spartina alterniflora* Loisel in a Georgia salt marsh 385

TOPLISS, B. J., Spectral variations in upwelling radiant intensity in turbid coastal waters. 395

WOLANSKI, E., An evaporation-driven salinity maximum zone in Australian tropical estuaries 415

DEGOBBIS, D., HOMME-MASLOWSKA, E., ORIO, A. A., DONAZZOLO, R. and PAVONI, B., The role of alkaline phosphatase in the sediments of Venice Lagoon on nutrient regeneration 425

UNCLES, R. J., ELLIOTT, R. C. A. and WESTON, S. A., Observed and computed lateral circulation patterns in a partly mixed estuary 439

KEENEY-KENNICUT, W. L. and PRESLEY, B. J., The geochemistry of trace metals in the Brazos River estuary 459

VAN DEN BERG, C. M. G., BUCKLEY, J. M., HUANG, Z. Q. and NIMMO, M., An electrochemical study of the speciation of copper, zinc and iron in two estuaries in England 479

KLEIN, M., Morphological changes of the artificial inlets of the Bardawil lagoon. . 487

COUSENS, R., Quantitative reproduction and reproductive efforts by stands of the brown alga *Ascophyllum nodosum* (L.) Le Jolis in South-eastern Canada . . . 495

NUMBER 5, MAY 1986

EDYVEAN, R. G. and MOSS, B. L., Microalgal communities on protected steel substrata in seawater 509

CARR, A. P. and BLACKLEY, M. W. L., Implications of sedimentological and hydrological processes on the distribution of radionuclides: the example of a salt marsh near Ravenglass, Cumbria 529

CHRZANOWSKI, T. H. and ZINGMARK, R., Passive filtering of microbial biomass by *Spartina alterniflora* 545

AZIZ, A. A. b A. and NEDWELL, D. B., The nitrogen cycle of an East Coast, U.K., saltmarsh: I. Nitrogen assimilation during primary production; detrital mineralization 559

IVERSON, R. L. and BITTAKER, H. F., Seagrass distribution and abundance in Eastern Gulf of Mexico coastal waters 577

DAVEY, J. T. and GEORGE, C. L., Factors in the distribution of intertidal estuarine polychaetes: a field experiment with *Nereis (Hediste) diversicolor* and *Nephtys hombergi* in the Tamar at Plymouth 603

KNOX, S., WHITFIELD, M., TURNER, D. R. and LIDDICOAT, M. I., Statistical analysis of estuarine profiles: III. Application to nitrate, nitrite and ammonium in the Tamar estuary 619

MILLARD, S. P. and LETTENMAIER, D. P., Optimal design of biological sampling programs using the analysis of variance 635

NUMBER 6, JUNE 1986

FLINT, R. W. and KALKE, R. D., Niche characterization of dominant estuarine benthic species 657

DONN, T. E., Jr. and CROCKER, R. A., Seasonal patterns of production in the sandy-beach amphipod *Haistorius canadensis* 675

Aziz, S. A. b A. and Nedwell, D. B., The nitrogen cycle of an east coast, U.K. saltmarsh: II. Nitrogen fixation, nitrification, denitrification, tidal exchange . . 689

Roper, D. S., Occurrence and recruitment of fish larvae in a northern New Zealand estuary 705

Cubit, J. D., Windsor, D. M., Thompson, R. C. and Burgett, J. M., Water-level fluctuations, emersion regimes, and variations of echinoid populations on a Caribbean reef flat 719

Wong, K-C., Sea-level fluctuations in a coastal lagoon 739

Tunberg, B., Studies on the population ecology of *Upogebia deltaura* (Leach) (Crustacea. Thalassinidea) 753

Gadel, F. and Texier, H., Distribution and nature of organic matter in recent sediments of Lake Nokoué, Benin (West Africa) 767

Scrope-Howe, S. and Jones, D. A., The vertical distribution of zooplankton in the western Irish Sea 785

Index to Volume 22

Note: The subject index is based upon the keywords allocated to each paper. The keywords are rotated in order so that each one appears once as the first index term. The complete list of permitted keywords is published in *Estuarine, Coastal and Shelf Science* **20**(1), i–xl.

Abundance; recruitment; salt marshes; tidal creek; Gulf of Mexico; killifish; atheriniformes, 101
Activity; Irish Sea; salt marshes; surveying; pressure transducers; water movement; core samples; radionuclides, 529
Adriatic Sea; nutrients; regeneration; enzymes; sediment-water interface; interstitial water, 425
Aerial photography; aerial surveys; estuaries; New Hampshire; salt marshes; ice rafting; peat, 379
Aerial surveys; estuaries; New Hampshire; salt marshes; ice rafting; aerial photography, 379
Africa West Coast; lagoon sedimentation; organic matter; humic substances, 767
Algae; community composition; steel; cathodic protection; paints; North Sea; English Channel; microflora; diatoms, 509
Ammonia; nitrites; estuaries; England Coast; nitrification; nitrogen cycle, 31
Ammonium; nitrification; England Coast; estuaries; mixing processes; statistical analysis; interstitial water; nitrate; nitrite, 619
Amphipod crustaceans; sand beaches; Gulf of Maine; secondary production; seasonal variations, 675
Anchor stations; water balance; numerical circulation model; England Coast; estuarine circulation, 439
ANDERSON, E. P., *see* MACKAS, D. L., 115
ANDERSON, F. E. and MEYER, L. M., The interaction of tidal currents on a disturbed intertidal bottom with a resulting change in particulate matter quantity, texture and food quality, 19
ANDERSON, G. F., Silica, diatoms and a freshwater productivity maximum in Atlantic coastal plain estuaries, Chesapeake Bay, 183
Atheriniformes; abundance; recruitment; salt marshes; tidal creek; Gulf of Mexico; killifish, 101
Atlantic Coastal Plain; silicon cycle; diatoms; tides; fresh waters; biogenic elements; partially-mixed estuary, 183
Australia North Coast; estuarine circulation; evaporation; salinity anomalies, 415
AZIZ, S. A. b A. and NEDWELL, D. B., The nitrogen cycle of an East Coast, U.K., saltmarsh: I. Nitrogen assimilation during primary production; detrital mineralization, 559
AZIZ, S. A. b A. and NEDWELL, D. B., The nitrogen cycle of an East Coast, U.K. saltmarsh: II. Nitrogen fixation, nitrification; denitrification, tidal exchange, 689
Bacteria; estuaries; filtration; *Spartina*, 545
Bacteriology; micro-algae; sediments; Bay of Fundy, 91
BAILLIE, P. W., Oxygenation of intertidal estuarine sediments by benthic microalgal photosynthesis, 143
BAKER, E. T., *see* FEELY, R. A., 215
BARNES, R. S. K., Daily activity rhythms in the intertidal gastropod *Hydrobia ulvae* (Pennant), 325
BAXTER, D., *see* PECKOL, P., 371
Bay of Fundy; bacteriology; micro-algae; sediments, 91
Bay of Fundy; upwelling; spectral analysis; optics; remote sensing; suspended sediments, 395
BELKNAP, D. F., *see* SCHWARTZ, D. L., 285
Benthic flora; micro-algae; photosynthesis; oxygen; intertidal environment; New England, 143
Benthic organisms; habitats; Corpus Christi Bay; niche, 657
Benthic organisms; habitats; fish; brackish waters; shallow waters; environmental conditions; organic matter, 357
Biogenic elements; partially-mixed estuary; Atlantic Coastal Plain; silicon cycle; diatoms; tides; fresh waters, 183
BITTAKER, H. F., *see* IVERSON, R. L., 577
BLACKLEY, M. W. L., *see* CARR, A. P., 529
Brackish waters; shallow waters; environmental conditions; organic matter; benthic organisms; habitats; fish, 357

Breeding; spatial distribution; seasonal variations; Irish Sea; Isopoda; littoral fauna; intertidal environment, 335
British Columbia Coast; community composition; zooplankton; fjords; suspended particles, 115
BUCKLEY, P. J. M., *see* VAN DEN BERG, C. M. G., 479
BURGETT, J. M., *see* CUBIT, J. D., 719
California; Echiuroidea; macrobenthos; population dynamics; faunal association; pollution; long-term changes; continental shelf, 1
California; estuaries, Holocene; tectonics; sea-level changes; paleoecology; Monterey Bay, 285
CAMMEN, L. M. and WALKER, J. A., The relationship between bacteria and micro-algae in the sediment of a Bay of Fundy mudflat, 91
Canada; fucales; reproduction; plasticity, 495
Carbon; dissolved organic compounds; energy budget; groundwater; interstitial water; pore waters; salt marshes; North Carolina Coast, 255
Caribbean Sea; tides; water levels; subaerial exposures; reef flats; echinoid populations; disturbance; sea levels, 719
CARR, A. P. and BLACKLEY, M. W. L., Implications of sedimentological and hydrological processes on the distribution of radionuclides: the example of a salt marsh near Ravenglass, Cumbria, 529
Cathodic protection; paints; North Sea; English Channel; microflora; diatoms; algae; community composition; steel, 509
Chesapeake Bay; hydrocarbons; sediments; marinas; pollution; estuaries, 271
Chlorophyll distribution; western Irish Sea; zooplankton; vertical migration, 785
CHRZANOWSKI, T. H. and ZINGMARK, R., Passive filtering of microbial biomass by *Spartina alterniflora*, 545
Circadian rhythms, intertidal environment; locomotion, 325
Colloids; speciation; electrochemistry; estuaries; copper; zinc; iron; vanadium, 479
Community composition; steel; cathodic protection; paints; North Sea; English Channel; microflora; diatoms; algae, 509
Community composition; zooplankton; fjords; suspended particles; British Columbia Coast, 115
Competition; distribution; England Coast; enclosures; mud flats; estuaries; Polychaeta, 603
Continental shelf; California; Echiuroidea; macrobenthos; population dynamics; faunal association; pollution; long-term changes, 1
Copper; zinc; iron; vanadium; colloids; speciation; electrochemistry; estuaries, 479
Core samples; radionuclides; activity; Irish Sea; salt marshes; surveying; pressure transducers; water movement, 529
Corpus Christi Bay; niche; benthic organisms; habitats, 657
COUSENS, R., Quantitative reproduction and reproductive effort by stands of the brown alga *Ascophyllum nodosum* (L.) Le Jolis in south-eastern Canada, 495
CRECELIUS, E. A., *see* FEELY, R. A., 215
CROKER, R. A., *see* DONN, T. E., JR, 675
Crustacea; Decapoda; population studies; Sweden Coast, 753
CUBIT, J. D., WINDSOR, D. M., THOMPSON, R. C. and BURGETT, J. M., Water-level fluctuations, emersion regimes, and variations of echinoid populations on a Caribbean reef flat, 719
DAVEY, J. T. and GEORGE, C. L., Factors in the distribution of intertidal, estuarine polychaetes: a field experiment with *Nereis (Hediste) diversicolor* and *Nephtys hombergi* in the Tamar at Plymouth, 603
Decapoda; population studies; Sweden Coast; crustacea, 753
DEGOBBIS, D., HOMME-MASLOWSKA, E., ORIO, A. A., DONAZZOLO, R. and PAVONI, B., The role of alkaline phosphatase in the sediments of Venice Lagoon on nutrient regeneration, 425
Denitrification; nitrogen fixation; saltmarshes; nitrogen cycle; nitrification, 689
Denmark; suspended sediments; estuarine sedimentation; tidal variations; flocculation; models, 241
Diatoms; algae; community composition; steel; cathodic protection; paints; North Sea; English Channel; microflora, 509
Diatoms; tides; fresh waters; biogenic elements; partially-mixed estuary; Atlantic Coastal Plain; silicon cycle, 183
Diopatra cuprea; tidal gradient; population dynamics; soft sediment, 371
Dispersion; estuaries; field data; mixing; pollution; prediction; tidal flow, 161

Dissolved organic compounds; energy budget; groundwater; interstitial water; pore waters; salt marshes; North Carolina Coast; carbon, 255
Dissolved organic compounds; seasonal cycles; temperature; salinity; Georgia coast; salt marshes, 385
Distribution; England Coast; enclosures; mud flats; estuaries; Polychaeta; competition, 603
Disturbance; sea levels; Caribbean Sea; tides; water levels; subaerial exposures; reef flats; echinoid populations, 719
DONAZZOLO, R., *see* DEGOBBIS, D., 425
DONN, T. E., JR and CROKER, R. A., Seasonal patterns of production in the sandy-beach amphipod *Haustorius canadensis*, 675
Dredging; groins; sediment budget; Mediterranean Sea; lagoons; inlets, 487
DYER, K. R., *see* NEW, A. L., 199
EAGLE, G. A., *see* ROSENTAL, R., 303
Echinoid populations; disturbance; sea levels; Caribbean Sea; tides; water levels; subaerial exposures; reef flats, 719
Echiuroidea; macrobenthos, population dynamics; faunal association; pollution; long-term changes; continental shelf; California, 1
EDYVEAN, R. G. J. and MOSS, B. L., Microalgal communities in protected steel substrata in seawater, 509
Electrochemistry; estuaries; copper; zinc; iron; vanadium; colloids, speciation, 479
ELLIOTT, R. C. A., *see* UNCLES, R. J., 439
Enclosures; mud flats; estuaries; Polychaeta; competition; distribution; England Coast, 603
Energy budget; groundwater; interstitial water; pore waters; salt marshes; North Carolina Coast; carbon; dissolved organic compounds, 255
England Coast; enclosures; mud flats; estuaries; Polychaeta; competition; distribution, 603
England Coast; estuaries; mixing processes; statistical analysis; interstitial water; nitrate; nitrite; ammonium; nitrification, 619
England Coast; estuarine circulation; anchor stations; water balance; numerical circulation model, 439
England Coast; internal waves; mixing; estuaries; spectral analysis, 199
England Coast; nitrification; nitrogen cycle; ammonia; nitrites; estuaries, 31
English Channel; microflora; diatoms; algae; community composition; steel; cathodic protection; paints; North Sea, 509
Entrainment; tidal inlets; tidal deltas; suspended sediments; mass transport; turbulence; jets; mixing, 45
Environmental conditions; organic matter; benthic organisms; habitats; fish; brackish waters; shallow waters, 357
Environmental monitoring; optimal sampling design; analysis of variance, 637
Enzymes; sediment-water interface; interstitial water; Adriatic Sea; nutrients; regeneration, 425
Estuaries; Chesapeake Bay; hydrocarbons; sediments; marinas; pollution, 271
Estuaries; copper; zinc; iron; vanadium; colloids; speciation; electrochemistry, 479
Estuaries; England Coast; nitrification; nitrogen cycle; ammonia; nitrites, 31
Estuaries; field data; mixing; pollution; prediction; tidal flow; dispersion, 161
Estuaries; filtration; *Spartina*; bacteria, 545
Estuaries; Holocene; tectonics; sea-level changes; paleoecology; Monterey Bay; California, 285
Estuaries; mixing processes; statistical analysis; interstitial water; nitrate; nitrite; ammonium; nitrification; England Coast, 619
Estuaries; mixing zone; geochemistry; transport; Gulf of Mexico; trace elements, 459
Estuaries; New Hampshire; salt marshes; ice rafting; peat; aerial photography; aerial surveys, 379
Estuaries; Polychaeta; competition; distribution; England Coast; enclosures; mud flats, 603
Estuaries; spectral analysis; England Coast; internal waves; mixing, 199
Estuarine circulation; anchor stations; water balance; numerical circulation model; England Coast, 439
Estuarine circulation; evaporation; salinity anomalies; Australia North Coast, 415
Estuarine sedimentation; tidal variations; flocculation; models; Denmark; suspended sediments, 241

Evaporation; salinity anomalies; Australia North Coast; estuarine circulation, 415
Extraction; trace minerals; marine; sediments, 303
Faunal association; pollution; long-term changes; continental shelf; California; Echiuroidea; macrobenthos; population dynamics, 1
FEELY, R. A., MASSOTH, G. J., BAKER, E. T., GENDRON, J. F., PAULSON, A. J. and CRECELIUS, E. A., Seasonal and vertical variations in the elemental composition of suspended and settling particulate matter in Puget Sound, Washington, 215
Field data; mixing; pollution; prediction; tidal flow; dispersion; estuaries, 161
Filtration; *Spartina*; bacteria; estuaries, 545
Fish; brackish waters; shallow waters; environmental conditions; organic matter; benthic organisms; habitats, 357
Fish; water temperature; regression analysis; Papua New Guinea; oceanography; Fourier analysis; time series; salinity, 63
Fish larvae; temporal variations; recruitment; New Zealand, 705
Fjords; suspended particles; British Columbia Coast; community composition; zooplankton, 115
FLINT, R. W. and KALKE, R. D., Niche characterization of dominant estuarine benthic species, 657
Flocculation; models; Denmark; suspended sediments; estuarine sedimentation; tidal variations, 241
Fourier analysis; time series; salinity; fish; water temperature; regression analysis; Papua New Guinea; oceanography, 63
Fresh waters; biogenic elements; partially-mixed estuary; Atlantic Coastal Plain; silicon cycle; diatoms; tides, 183
Fucales; reproduction; plasticity; Canada, 495
GADEL, F. and TEXIER, H., Distribution and nature of organic matter in recent sediments of Lake Nokoué, Benin (West Africa), 767
GENDRON, J. F., *see* FEELY, R. A., 215
Geochemistry; transport; Gulf of Mexico; trace elements; estuaries; mixing zone, 459
GEORGE, C. L., *see* DAVEY, J. T., 603
Georgia coast; salt marshes; dissolved organic compounds; seasonal cycles; temperature; salinity, 385
Groins; sediment budget; Mediterranean Sea; lagoons; inlets; dredging, 487
Groundwater; interstitial water; pore waters; salt marshes; North Carolina Coast; carbon; dissolved organic compounds; energy budget, 255
Gulf of Maine; secondary production; seasonal variations; amphipod crustaceans; sand beaches, 675
Gulf of Mexico; killifish; atheriniformes; abundance; recruitment; salt marshes; tidal creek, 101
Gulf of Mexico; trace elements; estuaries; mixing zone; geochemistry; transport, 459
Gulf of Mexico, eastern; seagrass distribution, 577
Habitats; Corpus Christi Bay; niche; benthic organisms, 657
Habitats; fish; brackish waters; shallow waters; environmental conditions; organic matter; benthic organisms, 357
HACKNEY, C. T., *see* YELVERTON, G. F., 255
HARDWICK-WITMAN, M. N., Aerial survey of a salt marsh: ice rafting to the lower intertidal zone, 379
HAYDOCK, C. I., *see* STULL, J. K., 1
Holocene; tectonics; sea-level changes; paleoecology; Monterey Bay; California; estuaries, 285
HOMME-MASLOWSKA, E., *see* DEGOBBIS, D., 425
HUANG, Z. Q., *see* VAN DEN BERG, C. M. G., 479
Humic substances; Africa West Coast; lagoon sedimentation; organic matter, 767
Hydrocarbons; sediments; marinas; pollution; estuaries; Chesapeake Bay, 271
Ice rafting; peat; aerial photography; aerial surveys; estuaries; New Hampshire; salt marshes, 379
Inlets; dredging; groins; sediment budget; Mediterranean Sea; lagoons, 487
Inlets; Long Island Coast; lagoons; tidal amplitudes, 739
Internal waves; mixing; estuaries; spectral analysis; England Coast, 199
Interstitial water; Adriatic Sea; nutrients; regeneration; enzymes; sediment-water interface, 425
Interstitial water; nitrate; nitrite; ammonium; nitrification; England Coast; estuaries; mixing processes; statistical analysis, 619

Interstitial water; pore waters; salt marshes; North Carolina Coast; carbon; dissolved organic compounds; energy budget; groundwater, 255
Intertidal; organic matter; resuspension; particulate matter protein, 19
Intertidal environment; breeding; spatial distribution; seasonal variations; Irish Sea; Isopoda; littoral fauna, 335
Intertidal environment; New England; benthic flora; micro-algae; photosynthesis; oxygen, 143
Intertidal environment; locomotion; circadian rhythms, 325
Irish Sea; Isopoda; littoral fauna; intertidal environment; breeding; spatial distribution; seasonal variations, 335
Irish Sea; salt marshes; surveying; pressure transducers; water movement; core samples; radionuclides; activity, 529
Irish Sea, western; zooplankton; vertical migration; chlorophyll distribution, 785
Iron; vanadium; colloids; speciation; electrochemistry; estuaries; copper; zinc, 479
Isopoda; littoral fauna; intertidal environment; breeding; spatial distribution; seasonal variations; Irish Sea, 335
Iverson, R. L. and Bittaker, H. F., Seagrass distribution and abundance in eastern Gulf of Mexico coastal waters, 577
Jets; mixing; entrainment; tidal inlets; tidal deltas; suspended sediments; mass transport; turbulence, 45
Jones, D. A., *see* Scrope-Howe, S., 785
Kalke, R. D., *see* Flint, R. W., 657
Keeney-Kennicutt, W. L. and Presley, B. J., The geochemistry of trace metals in the Brazos River estuary, 459
Killifish; atheriniformes; abundance; recruitment; salt marshes; tidal creek; Gulf of Mexico, 101
Klein, M., Morphological changes of the artificial inlets of the Bardawil lagoon, 487
Knox, S., Whitfield, M., Turner, D. R. and Liddicoat, M. I., Statistical analysis of estuarine profiles: III. Application to nitrate, nitrite and ammonium in the Tamar Estuary, 619
Kojis, B. L., *see* Quinn, N. J., 63
Lagoon sedimentation; organic matter; humic substances; Africa West Coast, 767
Lagoons; inlets; dredging; groins; sediment budget; Mediterranean Sea, 487
Lagoons; tidal amplitudes; inlets; Long Island Coast, 739
Lettenmaier, D. P., *see* Millard, S. P., 637
Lewis, R. E., *see* New, A. L., 199
Liddicoat, M. I., *see* Knox, S., 619
Lipcius, R. N. and Subrahmanyam, C. B., Temporal factors influencing killifish abundance and recruitment in Gulf of Mexico salt marshes, 101
Littoral fauna; intertidal environment; breeding; spatial distribution; seasonal variations; Irish Sea; Isopoda, 335
Locomotion; circadian rhythms; intertidal environment, 325
Long Island Coast; lagoons; tidal amplitudes; inlets, 739
Long-term changes; continental shelf; California; Echiuroidea; macrobenthos; population dynamics; faunal association; pollution, 1
Mackas, D. L. and Anderson, E. P., Small-scale zooplankton community variability in a northern British Columbia fjord system, 115
Macrobenthos; population dynamics; faunal association; pollution; long-term changes; continental shelf; California; Echiuroidea, 1
Mangat, J. S., *see* West, J. R., 161
Marinas; pollution; estuaries; Chesapeake Bay; hydrocarbons; sediments, 271
Marine; sediments; extraction; trace minerals, 303
Mass transport; turbulence; jets; mixing; entrainment; tidal inlets; tidal deltas; suspended sediments, 45
Massoth, G. J., *see* Feely, R. A., 215
Mediterranean Sea; lagoons; inlets; dredging; groins; sediment budget, 487
Micro-algae; photosynthesis; oxygen; intertidal environments; New England; benthic flora, 143
Micro-algae; sediments; Bay of Fundy; bacteriology, 91

Microflora; diatoms; algae; community composition; steel; cathodic protection; paints; North Sea; English Channel, 509
MILLARD, S. P. and LETTENMAIER, D. P., Optimal design of biological sampling programs using the analysis of variance, 637
Mineralization; salt marshes; nitrogen cycle; primary production, 559
Mixing; entrainment; tidal inlets; tidal deltas; suspended sediments; mass transport; turbulence; jets, 45
Mixing; estuaries; spectral analysis; England Coast; internal waves, 199
Mixing; pollution; prediction; tidal flow; dispersion; estuaries; field data, 161
Mixing processes; statistical analysis; interstitial water; nitrate; nitrite; ammonium; nitrification; England Coast; estuaries, 619
Mixing zone; geochemistry; transport; Gulf of Mexico; trace elements; estuaries, 459
Models; Denmark; suspended sediments; estuarine sedimentation; tidal variations; flocculation, 241
MONTAGNE, D. E., *see* STULL, J. K., 1
Monterey Bay; California; estuaries; Holocene; tectonics; sea-level changes; paleoecology, 285
MOSS, B. L., *see* EDYVEAN, R. G. J., 509
MEYER, L. M., *see* ANDERSON, F. E., 19
Mud flats; estuaries; Polychaeta; competition; distribution; England Coast; enclosures, 603
MULLINS, H. T., *see* SCHWARTZ, D. L., 285
NEDWELL, D. B., *see* AZIZ, S. A. b A., 559, 689
NEW, A. L., DYER, K. R. and LEWIS, R. E., Predictions of the generation and propagation of internal waves and mixing in a partially stratified estuary, 199
New England; benthic flora; micro-algae; photosynthesis; oxygen; intertidal environment, 143
New Hampshire; salt marshes; ice rafting; peat; aerial photography; aerial surveys; estuaries, 379
New Zealand; fish larvae; temporal variations; recruitment, 705
Niche; benthic organisms; habitats; Corpus Christi Bay, 657
NIMMO, M., *see* VAN DEN BERG, C. M. G., 479
Nitrate; nitrite; ammonium; nitrification; England Coast; estuaries; mixing processes; statistical analysis; interstitial water, 619
Nitrification; denitrification; nitrogen fixation; saltmarshes; nitrogen cycle, 689
Nitrification; England Coast; estuaries; mixing processes; statistical analysis; interstitial water; nitrate; nitrite; ammonium, 619
Nitrification; nitrogen cycle; ammonia; nitrites; estuaries; England Coast, 31
Nitrites; estuaries; England Coast; nitrification; nitrogen cycle; ammonia, 31
Nitrogen cycle; ammonia; nitrites; estuaries; England Coast; nitrification, 31
Nitrogen cycle; nitrification; denitrification; nitrogen fixation; saltmarshes, 689
Nitrogen cycle; primary production; mineralization; salt marshes, 559
Nitrogen fixation; saltmarshes; nitrogen cycle; nitrification; denitrification, 689
North Carolina Coast; carbon; dissolved organic compounds; energy budget; groundwater; interstitial water; pore waters; salt marshes, 255
North Sea; English Channel; microflora; diatoms; algae; community composition; steel; cathodic protection; paints, 509
Numerical circulation model; England Coast; estuarine circulation; anchor stations; water balance, 439
Nutrients; regeneration; enzymes; sediment-water interface; interstitial water; Adriatic Sea, 425
Oceanography; Fourier analysis; time series; salinity; fish; water temperature; regression analysis; Papua New Guinea, 63
Optics; remote sensing; suspended sediments; Bay of Fundy; upwelling; spectral analysis; 395
Optimal sampling design; analysis of variance; environmental monitoring, 637
Organic matter; benthic organisms; habitats; fish; brackish waters; shallow waters; environmental conditions, 357
Organic matter; humic substances; Africa West Coast; lagoon sedimentation, 767
Organic matter; resuspension; particulate matter protein; intertidal, 19
ORIO, A. A., *see* DEGOBBIS, D., 425
ORREN, M. J., *see* ROSENTAL, R., 303
OWENS, N. J. P., Estuarine nitrification: a naturally occurring fluidized bed reaction?, 31

Oxygen; intertidal environment; New England; benthic flora; micro-algae; photosynthesis, 143
Özsoy, E., Ebb-tidal jets: a model of suspended sediment and mass transport at tidal inlets, 45
Paints; North Sea; English Channel; microflora; diatoms; algae; community composition; steel; cathodic protection, 509
Pakulski, J. D., The release of reducing sugars and dissolved organic carbon from *Spartina alterniflora* Loisel in a Georgia salt marsh, 385
Paleoecology; Monterey Bay; California; estuaries; Holocene; tectonics; sea-level changes, 285
Papua New Guinea; oceanography; Fourier analysis; time series; salinity; fish; water temperature; regression analysis, 63
Partially-mixed estuary; Atlantic Coastal Plain; silicon cycle; diatoms; tides; fresh waters; biogenic elements, 183
Particulate matter protein; intertidal; organic matter; resuspension, 19
Paulson, A. J., *see* Feely, R. A., 215
Pavoni, B., *see* Degobbis, D., 425
Peat; aerial photography; aerial surveys; estuaries; New Hampshire; salt marshes; ice rafting, 379
Peckol, P. and Baxter, D., Population dynamics of the onuphid polychaete *Diopatra cuprea* (Bosc) along a tidal exposure gradient, 371
Pejrup, M., Parameters affecting fine-grained suspended sediment concentrations in a shallow micro-tidal estuary, Ho Bugt, Denmark, 241
Photosynthesis; oxygen; intertidal environment; New England; benthic flora; micro-algae, 143
Plasticity; Canada; fucales; reproduction, 495
Pollution; estuaries; Chesapeake Bay; hydrocarbons; sediments; marinas, 271
Pollution; long-term changes; continental shelf; California; Echiuroidea; macrobenthos; population dynamics; faunal association, 1
Pollution; prediction; tidal flow; dispersion; estuaries; field data; mixing, 161
Polychaeta; competition; distribution; England Coast; enclosures; mud flats; estuaries, 603
Population dynamics; faunal association; pollution; long-term changes; continental shelf; California; Echiuroidea; macrobenthos, 1
Population dynamics; soft sediment; *Diopatra cuprea*; tidal gradient, 371
Population studies; Sweden Coast; crustacea; Decapoda, 743
Pore waters; salt marshes; North Carolina Coast; carbon; dissolved organic compounds; energy budget; groundwater; interstitial water, 255
Prediction; tidal flow; dispersion; estuaries; field data; mixing; pollution, 161
Presley, B. J., *see* Keeney-Kennicutt, W. L., 459
Pressure transducers; water movement; core samples; radionuclides; activity; Irish Sea; salt marshes; surveying, 529
Primary production; mineralization; salt marshes; nitrogen cycle, 559
Puget Sound; suspended matter; trace elements; seasonal variation, 215
Quinn, N. J. and Kojis, B. L., Annual variation in the nocturnal nekton assemblage of a tropical estuary, 63
Radionuclides; activity; Irish Sea; salt marshes; surveying; pressure transducers; water movement; core samples, 529
Recruitment; New Zealand; fish larvae; temporal variations, 705
Reef flats; echinoid populations; disturbance; sea levels; Caribbean Sea; tides; water levels; subaerial exposures, 719
Regeneration; enzymes; sediment-water interface; interstitial water; Adriatic Sea; nutrients, 425
Regression analysis; Papua New Guinea; oceanography; Fourier analysis; time series; salinity; fish; water temperature, 63
Remote sensing; suspended sediments; Bay of Fundy; upwelling; spectral analysis; optics, 395
Reproduction; plasticity; Canada, fucales, 495
Resuspension; particulate matter protein; intertidal; organic matter, 19
Roper, D. S., Occurrence and recruitment of fish larvae in a northern New Zealand estuary, 705
Rosental, R., Eagle, G. A. and Orren, M. J., Trace metal distribution in different chemical fractions of nearshore marine sediments, 303
Salemaa, H., Breeding biology and microhabitat utilization of the intertidal isopod *Idotea granulosa* Rathke, in the Irish Sea, 335

Salinity; fish; water temperature; regression analysis; Papua New Guinea; oceanography; Fourier analysis; time series, 63
Salinity; Georgia coast; salt marshes; dissolved organic compounds; seasonal cycles; temperature, 385
Salinity anomalies; Australia North Coast; estuarine circulation; evaporation, 415
Salt marshes; dissolved organic compounds; seasonal cycles; temperature; salinity; Georgia coast, 385
Salt marshes; ice rafting; peat; aerial photography; aerial surveys; estuaries; New Hampshire, 379
Saltmarshes; nitrogen cycle; nitrification; denitrification; nitrogen fixation, 689
Salt marshes; nitrogen cycle; primary production; mineralization, 559
Salt marshes; North Carolina Coast; carbon; dissolved organic compounds; energy budget; groundwater; interstitial water; pore waters, 255
Salt marshes; surveying; pressure transducers; water movement; core samples; radionuclides; activity; Irish Sea, 529
Salt marshes; tidal creek; Gulf of Mexico; killifish; atheriniformes; abundance; recruitment, 101
Sand beaches; Gulf of Maine; secondary production; seasonal variations; amphipod crustaceans, 675
SCHWARTZ, D. L., MULLINS, H. T. and BELKNAP, D. F., Holocene geologic history of a transform margin estuary: Elkhorn Slough, central California, 285
SCROPE-HOWE, S. and JONES, D. A., The vertical distribution of zooplankton in the western Irish Sea, 785
Sea-level changes; paleoecology; Monterey Bay; California; estuaries; Holocene; tectonics, 285
Sea levels; Caribbean Sea; tides; water levels; subaerial exposures; reef flats; echinoid populations; disturbance, 719
Seagrass distribution; eastern Gulf of Mexico, 577
Seasonal cycles; temperature; salinity; Georgia coast; salt marshes; dissolved organic compounds, 385
Seasonal variation; Puget Sound; suspended matter; trace elements, 215
Seasonal variations; amphipod crustaceans; sand beaches; Gulf of Maine; secondary production, 675
Seasonal variations; Irish Sea; Isopoda; littoral fauna; intertidal environment; breeding; spatial distribution, 335
Secondary production; seasonal variations; amphipod crustaceans; sand beaches; Gulf of Maine, 675
Sediment budget; Mediterranean Sea; lagoons; inlets; dredging; groins, 487
Sediments; Bay of Fundy; bacteriology; micro-algae, 91
Sediments; extraction; trace minerals; marine, 303
Sediments; marinas; pollution; estuaries; Chesapeake Bay; hydrocarbons, 271
Sediment-water interface; interstitial water; Adriatic Sea; nutrients; regeneration; enzymes, 425
Shallow waters; environmental conditions; organic matter; benthic organisms; habitats; fish; brackish waters, 357
Silicon cycle; diatoms; tides; fresh waters; biogenic elements; partially-mixed estuary; Atlantic Coastal Plain, 183
SMITH, C. L., *see* VOUDRIAS, E. A., 271
Soft sediment; *Diopatra cuprea*; tidal gradient; population dynamics, 371
Spartina; bacteria; estuaries; filtration, 545
Spatial distribution; seasonal variations; Irish Sea; Isopoda; littoral fauna; intertidal environment; breeding, 335
Speciation; electrochemistry; estuaries; copper; zinc; iron; vanadium; colloids, 479
Spectral analysis; England Coast; internal waves; mixing; estuaries, 199
Spectral analysis; optics; remote sensing; suspended sediments; Bay of Fundy; upwelling, 395
Statistical analysis; interstitial water; nitrate; nitrite; ammonium; nitrification; England Coast; estuaries; mixing processes, 619
Steel; cathodic protection; paints; North Sea; English Channel; microflora; diatoms; algae; community composition, 509

Stull, J. K., Haydock, C. I. and Montagne, D. E., Effects of *Listriolobus pelodes* (Echiura) on coastal shelf benthic communities and sediments modified by a major California wastewater discharge, 1
Subaerial exposures; reef flats; echinoid populations; disturbance; sea levels; Caribbean Sea; tides; water levels, 719
Subrahmanyam, C. B., *see* Lipcius, R. N., 101
Surveying; pressure transducers; water movement; core samples; radionuclides; activity; Irish Sea; salt marshes, 529
Suspended matter; trace elements; seasonal variation; Puget Sound, 215
Suspended particles; British Columbia Coast; community composition; zooplankton; fjords, 115
Suspended sediments; Bay of Fundy; upwelling; spectral analysis; optics; remote sensing, 395
Suspended sediments; estuarine sedimentation; tidal variations; flocculation; models; Denmark, 241
Suspended sediments; mass transport; turbulence; jets; mixing; entrainment; tidal inlets; tidal deltas, 45
Sweden Coast; crustacea; Decapoda; population studies, 753
Tectonics; sea-level changes; paleoecology; Monterey Bay; California; estuaries; Holocene, 285
Temperature; salinity; Georgia coast; salt marshes; dissolved organic compounds; seasonal cycles, 385
Temporal variations; recruitment; New Zealand; fish larvae, 705
Texier, H., *see* Gadel, F., 767
Thompson, R. C., *see* Cubit, J. D., 719
Thorman, S., Physical factors affecting abundance and species richness of fishes in the shallow waters of the southern Bothnian Sea (Sweden), 357
Tidal amplitudes; inlets; Long Island Coast; lagoons, 739
Tidal creek; Gulf of Mexico; killifish; atheriniformes; abundance; recruitment; salt marshes, 101
Tidal deltas; suspended sediments; mass transport; turbulence; jets; mixing; entrainment; tidal inlets, 45
Tidal flow; dispersion; estuaries; field data; mixing; pollution; prediction, 161
Tidal gradient; population dynamics; soft sediment; *Diopatra cuprea*, 371
Tidal inlets; tidal deltas; suspended sediments; mass transport; turbulence; jets; mixing; entrainment, 45
Tidal variations; flocculation; models; Denmark; suspended sediments; estuarine sedimentation, 241
Tides; fresh waters; biogenic elements; partially-mixed estuary; Atlantic Coastal Plain; silicon cycle; diatoms, 183
Tides; water levels; subaerial exposures; reef flats; echinoid populations; disturbance; sea levels; Caribbean Sea, 719
Time series; salinity; fish; water temperature; regression analysis; Papua New Guinea; oceanography; Fourier analysis, 63
Topliss, B. J., Spectral variations in upwelling radiant intensity in turbid coastal waters, 395
Trace elements; estuaries; mixing zone; geochemistry; transport; Gulf of Mexico, 459
Trace elements; seasonal variation; Puget Sound; suspended matter, 215
Trace minerals; marine; sediments; extraction, 303
Transport; Gulf of Mexico; trace elements; estuaries; mixing zone; geochemistry, 459
Tunberg, B., Studies on the population ecology of *Upogebia deltaura* (Leach) (Crustacea, Thalassinidea), 753
Turbulence; jets; mixing; entrainment; tidal inlets; tidal deltas; suspended sediments; mass transport, 45
Turner, D. R., *see* Knox, S., 619
Uncles, R. J., Elliott, R. C. A. and Weston, S. A., Observed and computed lateral circulation patterns in a partly mixed estuary, 439
Upwelling; spectral analysis; optics; remote sensing; suspended sediments; Bay of Fundy, 395
Van Den Berg, C. M. G., Buckley, P. J. M., Huang, Z. Q. and Nimmo, M., An electrochemical study of the speciation of copper, zinc and iron in two estuaries in England, 479
Vanadium; colloids; speciation; electrochemistry; estuaries; copper; zinc; iron, 479

Variance analysis; environmental monitoring; optimal sampling design, 637
Vertical migration; chlorophyll distribution; western Irish Sea; zooplankton, 785
VOUDRIAS, E. A. and SMITH, C. L., Hydrocarbon pollution from marinas in estuarine sediments, 271
WALKER, J. A., *see* CAMMEN, L. M., 91
Water balance; numerical circulation model; England Coast; estuarine circulation; anchor stations, 439
Water levels; subaerial exposures; reef flats; echinoid populations; disturbance; see levels; Caribbean Sea; tides, 719
Water movement; core samples; radionuclides; activity; Irish Sea; salt marshes; surveying; pressure transducers, 529
Water temperature; regression analysis; Papua New Guinea; oceanography; Fourier analysis; time series; salinity; fish, 63
WEST, J. R. and MANGAT, J. S., The determination and prediction of longitudinal dispersal coefficients in a narrow, shallow estuary, 161
WESTON, S. A., *see* UNCLES, R. J., 439
WHITFIELD, M., *see* KNOX, S., 619
WINDSOR, D. M., *see* CUBIT, J. D., 719
WOLANSKI, E., An evaporation-driven salinity maximum zone in Australian tropical estuaries, 415
WONG, K-C., Sea-level fluctuations in a coastal lagoon, 739
YELVERTON, G. F. and HACKNEY, C. T., Flux of dissolved organic carbon and pore water through the substrate of a *Spartina alterniflora* marsh in North Carolina, 255
Zinc; iron, vanadium; colloids; speciation; electrochemistry; estuaries; copper, 479
ZINGMARK, R., *see* CHRZANOWSKI, T. H.
Zooplankton; fjords; suspended particles; British Columbia Coast; community composition, 115
Zooplankton; vertical migration; chlorophyll distribution; western Irish Sea, 785